

NOV 07 2007

Serial No. 10/770,893
67097-022; EH-11083**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Song
Serial No.: 10/770,893
Filed: February 3, 2004
Group Art Unit: 1742
Examiner: Morillo, Janell Combs
Title: CASTABLE HIGH TEMPERATURE ALUMINUM ALLOY

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

DECLARATION UNDER CFR 1.131

- 1) I have invented the subject matter set forth in the above-referenced application, CASTABLE HIGH TEMPERATURE ALUMINUM ALLOY.
- 2) At the time of the invention, I was employed by United Technologies Corporation of Hartford, Connecticut. I invented the subject matter set forth in the above-referenced application in the course of my employment in the United States.
- 3) As evidenced in attached Exhibits A - C and explained below, Applicant, Applicant's representative, and I diligently worked on the invention and preparation of the subject application between a date before the April 24, 2003 effective date of cited reference U.S. Publication 2004/0055671 to Olson, et al. (hereafter "Olsen") up to the filing of the subject application.
- 4) Exhibit A is a redacted copy of the Invention Disclosure of the subject application. I prepared the Invention Disclosure on or about June 15, 2001, as evidenced by my signature the 5th page of Exhibit A and the signature of two witnesses who understood the inventive concept at that time. Therefore, the date of conception of the subject application was at least as early as June 15, 2001, which is prior to the April 24, 2003 effective date of Olsen.
- 5) The 1st page of Exhibit A also indicates that the Invention Disclosure of the subject application was submitted to the internal patent review committee ("P.A.B.") of Applicant on July 24, 2003 to review for patenting in due course and with reasonable diligence in view of Applicant's backlog of work.
- 6) Exhibit B is a redacted instruction document to draft the subject application that Applicant issued on or about October 23, 2003 to Applicant's representative upon approval of the Invention Disclosure for the drafting of the subject application, which I believe they did with reasonable diligence in view of their likely backlog of work.

Serial No. 10/770,893
67097-022; EH-11083

- 7) Exhibit C is a copy of a redacted chain of emails between Applicant, Applicant's representative, and me between the dates of December 11, 2003 and February 2, 2004. As evidenced on the 8th page of Exhibit C, Applicant's representative emailed an attachment of the first draft of the subject application for review on December 11, 2003. As evidenced by the emails on the 1st through 7th pages of Exhibit C, Applicant, Applicant's representative, and I reviewed and revised the subject application in view of our backlog of work at the time between December 11, 2003 and February 2, 2004. The subject application was then filed on February 2, 2004.
- 8) I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

IN TESTIMONY WHEREOF, I hereunto set my hand at Stratford, in the State of Connecticut, this 7th day of November, 2007.


Shihong Gary Song

STATE OF CONNECTICUT)
COUNTY OF Fairfield)

Before me personally appeared said Shihong Gary Song, and acknowledged the foregoing instrument to be his own free act and deed, this 7th day of November, 2007.


Notary Public

My Commission Expires November 30, 2007

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EXHIBIT A

ACKNOWLEDGE ☐SCAN ☐XFER TO PAB ☐PATENT ADVISORY BOARD
INVENTION DISCLOSURE SUMMARYRECEIVED
CENTRAL FAX CENTERCOGNIZANT ADVISORY BOARD: ☒ New Product ☐ License & Repair ☐ PMA

NOV 07 2007

DATE TRANSFERRED TO P.A.B. 24 JULY 2003DOCKET NO. R-4554 EH-11083TITLE: AL-Gd ALLOY FOR ELEVATED TEMPS.INVENTOR(S) SONGTECHNICAL CATEGORY
NUMBER AND NAME1ALLOYSUSG CONTRACT? 

Agency:

- ☐
- DOE
-
- ☐
- NASA
-
- ☐
- USN
-
- ☐
- USAF
-
- ☐
- OTHER _____

TARGET DECISION DATE: NONETARGET FILING DATE: NONE

Product(s):

Explain any rights of non-P&W and/or non-UTC entities (other than U.S.G.)

Remarks to P.A.B.

NONE

CONFIDENTIAL, ATTORNEY-CLIENT, ATTORNEY WORK PRODUCT. PRIVILEGED.

This form is for the use of the P&W Patent Advisory Board
and Counsel, and is not part of the Invention Disclosure.

Internal Correspondence**United
Technologies**Research Center
Legal Department

TO: Kenneth Baran

RE: Docket Number: R-4554

Title: "Al-Gd Alloy for Elevated Temperature Applications"

Inventors: S. G. Song

Attorney: Ronald Cummings

Enclosed is a copy of the referenced invention disclosure which was disclosed to the Research Center docket on [REDACTED] and is currently under review to determine the need for patent protection.

In view of its relation to your business, we are offering the disclosure to you for adoption. Should you choose to adopt this invention, please assign your division docket number to the disclosure and notify me so that we may close our records, and transfer the invention to your docket. I can be reached by telephone at [REDACTED] or by fax at [REDACTED].

Please contact me with your response no later than [REDACTED]. Craig Walker and John Miller at PW can comment on the patentability of this disclosure; therefore, please include them in your discussions when evaluating this invention. If there is no response by this date, we will assume adoption of this project has been declined.

The associated UTRC row and column managers copied on this memo will be notified of your decision, and may decide to file the case from UTRC, if such action seems appropriate.

Technical questions regarding this disclosure should be directed to the inventors.

*Ronald Cummings*Ronald Cummings
Assistant Intellectual Property Counsel
MS 129-06

Enclosure (via interoffice mail)

To Addressee: Important - Return This Sheet By Fax To 860 610-7248

1. Decision to adopt to our unit: ☐ YES I wish to adopt. ☐ NO I decline to adopt.
2. Reason for decline: _____

Signed and Dated: _____

UTRC INVENTION DISCLOSURE ROUTING SLIP

TO BE COMPLETED BY INVENTOR: Please Enter The Title of the Invention, Names Of Inventor(s), and Names Of Division Program Leader(s) (DPL(s)) for the Business Unit(s) ("BU") listed in question 4(a) of the UTRC Invention Questionnaire.

TITLE: Al-Gd alloy for elevated temperature applications

INVENTOR(S): Shihong G. Song

DPL Name: Vince Nardone

BU: P & W

*Initials: JCN

*Date: 6/29/01

DPL Name: Michael Winter

BU: HS

*Initials: MW

*Date: 6/29/01

DPL Name:

BU:

*Initials:

*Date:

SHADED AREAS TO BE COMPLETED BY DIVISION PROGRAM LEADER (DPL)

You have been sent the attached original Invention Disclosure and UTRC Invention Questionnaire because the invention may benefit the Business Unit ("BU") for which you are responsible. The purpose of your review at this time is mainly informational. Within two weeks of receipt:

1. Please review the Invention Disclosure and initial and date in the space provided above.
2. In Item 1.(d) of the UTRC Invention Questionnaire, the inventors of the present invention were asked to list the names of the individuals at the BU who should be contacted to evaluate this invention. If you believe that additional individuals at the BU should be contacted, please list their names and association below.

Additional Evaluator Name: _____ Business Unit: _____

Additional Evaluator Name: _____ Business Unit: _____

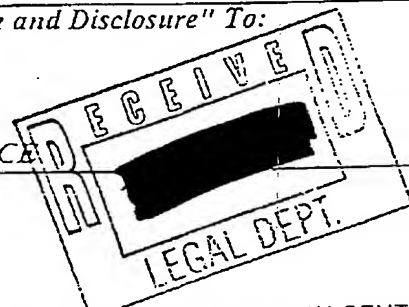
Additional Evaluator Name: _____ Business Unit: _____

3. If you are the only or last listed DPL, please forward this package to the UTRC Law Department at the address indicated at the bottom of the page. The UTRC Law Department will forward the attached to the relevant BU(s) for adoption. The BU(s) will, in turn, decide whether it is interested in adopting this invention. As a DPL for a BU that may benefit from the invention, if you feel that such BU should adopt the invention, you are encouraged to contact that BU and apprise the appropriate individuals of your views.

4. If you are not the only or last listed DPL, please forward this package to the next listed DPL. As a DPL for a BU that may benefit from the invention, if you feel that such BU should adopt the invention, you are encouraged to contact that BU and apprise the appropriate individuals of your views.

Last listed DPL: Forward The "Routing Slip, Questionnaire and Disclosure" To:

UTRC LAW DEPARTMENT
MS 129-6
ATTENTION: LORETTA N. LAWRENCE



UNITED TECHNOLOGIES RESEARCH CENTER

Invention Disclosure

(6/15/01)

Shihong G. Song

Materials and Processing

Al-Gd alloy for Elevated Temperature Applications

Background

Cast and ingot/metallurgy (I/M) high temperature aluminum (HTA) alloys are characterized by the following metallurgic properties:

- 1) Primary alloy system, binary or ternary, is eutectic,
- 2) System eutectic composition is high in alloying content such that adequate volume fraction of the second phases (intermetallics) can be attained,
- 3) Main second phases (intermetallics) are of Al_3X (X is the primary alloying element) form,
- 4) A coherent or semi-coherent interface between aluminum matrix and the main second phase exists in nucleation and early stage of growth during solidification,
- 5) The melting point of the intermetallics is significantly higher than the that of aluminum,
- 6) Alloy eutectic temperature is not significantly lower than the melting point of aluminum,
- 7) Low solubility of the primary alloying elements in the aluminum matrix.

Three rare earth (RE) elements, namely yttrium, ytterbium, and erbium, have been identified to possess most of these properties. None of these elements, however, are best suited for the purpose in both cost and property terms.

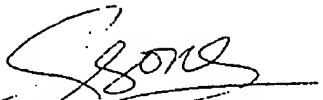
It was recently recognized that gadolinium can serve as a better candidate than the above three for the intended applications, which is elaborated below.

Invention

Gadolinium is a RE element bridging light and heavy RE groups. Its commercial availability is similar to yttrium and is among the top rare elements with relatively high yield on the market. This is also reflected by its current low price (70% of yttrium). Gadolinium has a limited application in nuclear industry because of its large cross section area, but having a low absorption parameter.

Aluminum gadolinium system has the highest RE content at the binary eutectic composition (~5 at%) among Al-RE systems. The binary Al_3Gd intermetallic is the most stable (mp~1125°C) among the Al_3RE group. Al_3Gd is comparable to Al_3Y in terms of crystal structure and can easily form coherent and semi-coherent interface with the aluminum matrix. Other properties of Al-Gd system are similar or better than Al-Y system.

Gadolinium is very attractive to replacing Yb and Er in the cast and I/M HTA materials. It is worth noting that the neglect of the gadolinium in the initial effort of the present program was due to a printing error in the literature that was widely copied.



Inventor's signature

6/15/01

Date

Shihong G. Song

Inventor's printed name

6/15/01

Inventor's signature

Date

Inventor's printed name



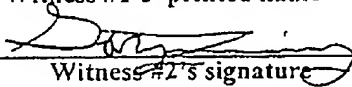
Witness #1's signature

6/15/01

Date

Tom Garosshen

Witness #1's printed name



Witness #2's signature

6/28/01

Date

Gary D. Linsey

Witness #2's printed name

UTRC INVENTION QUESTIONNAIRE

Title of Invention:	Al-Gd alloy for elevated temperature applications		
Program Name:	UTRC internal	Division Program Leader(s):	Vince Nardone
TO BE FILLED OUT BY LEGAL DEPARTMENT DOCKET NUMBER:			

1. Specific development of this invention:

- (a) When did you conceive this invention? Date: [REDACTED]
 To which project were you charging your time? Project No.: 5.304.0001-5.1
- (b) Has the invention been successfully built or tested? Yes [REDACTED] No [REDACTED]
 • If yes, when? [REDACTED] How? [REDACTED]
 • If no, what future effort is planned to build or test this invention? depending on future funding
 • What business unit, government agency, or customer will sponsor the testing? [REDACTED]

2. UTRC Contract and proposal information (include both government and commercial contracts):

Was the invention conceived or successfully built or tested in the performance of work under:

- A UTRC Prime Government Contract or a Commercial Contract/Agreement: Yes [REDACTED] No [REDACTED]
 Gov't Contract #: [REDACTED] or Commercial Contract/Agmt #: [REDACTED]
 Gov't Agency or Customer Name: [REDACTED]
- A UTRC Subcontract under a non-UTC Prime Government Contract: Yes [REDACTED] No [REDACTED]
 Subcontract #: [REDACTED] Customer Name: [REDACTED]
- An InterDivisional Work Authorization (IDWA): Yes [REDACTED] No [REDACTED]
 UTC Business Unit: [REDACTED] Business Unit Gov't Contract #: [REDACTED]

3. Disclosure of invention outside UTRC:

- (a) Has the invention been disclosed to others outside UTRC, or included in any printed publications, seminars, presentations, trade shows, exhibits? Yes [REDACTED] No [REDACTED]
- (b) If yes, disclosed to whom and under what circumstances? [REDACTED]
- (c) Date of disclosure: [REDACTED]

4. Business Unit Information:

- (a) UTC Business Units that may be interested in this invention: [REDACTED]
- (b) Names of individual(s) at each Business Unit who should be contacted to evaluate invention:
 Craig Walker, John Miller
- (c) Current or potential uses/products: Turbine engine components

	Inventor # 1	Inventor # 2	Inventor # 3
Inventor(s) signature:			
Typed Full Legal Name:	Shihong Gary Song		
Business Unit:	UTRC		
Mail Stop:	129-22		
Telephone:	[REDACTED]		

	Inventor # 4	Inventor # 5	Inventor # 6
Inventor(s) signature:			
Typed Full Legal Name:			
Business Unit:			
Mail Stop:			
Telephone:			

Revised 7/8/99

UTRC 4-51

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EXHIBIT B

Pratt & Whitney
Legal Department - Intellectual Property
Outside Counsel Information Package.

• PW Docket Number: EH-11083 Date: 10/23/2003
• Lawpack Number: PWA017565

• Government Rights Notice: ☐ Yes ☐ No
Agency: ☐
Contract Number: ☐

• (35 USC § 102) Statutory Bar: ☐ Yes ☐ No
Target Filing Date: ☐

• Rationale for Patenting:

• PW Contacts:

Attorney/Agent: Name: F. Tyler Morrison Phone: / Fax: ☐
Paralegal: Anna Sardinskas ☐

• General Instructions:

- Provide an e-mail with attachments for application as filed including drawings to the Attorney at: franklyn.morrison@pw.utc.com and to: turleyks@pw.utc.com.
- When sending the draft application to the inventors for review, also send a copy to the Attorney.
- Reference both the Docket number and Lawpack number on all invoices.

• Special Instructions:

Pratt & Whitney
Proprietary

EXHIBIT C

Butchko, Karin H.

From: Morrison, Franklyn T. [donald.kennedy@utc.com]
Sent: Monday, February 02, 2004 7:25 AM
To: Butchko, Karin H.; ROMANIK, GEORGE J HS
Cc: SONG, SHIHONG G UTRC; CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled "High temperature aluminum gadolinium alloy"

Redacted

-----Original Message-----

From: Butchko, Karin H. [mailto:kbutchko@cgoilaw.com]
Sent: Thursday, January 29, 2004 4:56 PM
To: Romanik, George J. HS
Cc: SONG, SHIHONG G UTRC; MORRISON, FRANKLYN T PW ; CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled "High temperature aluminum gadolinium alloy"

Gary has approved the application for filing. Please let me know if you have any additional comments. Thanks,

Karin H. Butchko
Carlson, Gaskey & Olds, P.C.
400 W. Maple Rd., Ste. 350
Birmingham, MI 48009
(248) 988-8688 Direct Dial
(248) 988-8360 Main
(248) 988-8363 Fax
Email: kbutchko@carlsongaskeyolds.com

-----Original Message-----

From: Romanik, George J. HS [mailto:george.romanik@hs.utc.com]
Sent: Tuesday, January 27, 2004 10:50 AM
To: Butchko, Karin H.
Cc: SONG, SHIHONG G UTRC; MORRISON, FRANKLYN T PW ; CUMMINGS, RONALD G UTRC
Subject: FW: patent application for your reference EH-11083 entitled

NOV 07 2007

"High temperature aluminum gadolinium alloy"

Karin,

Please see the attachment for several comment I had. I think I've either explained them in the text or they are self-explanatory. Let me know if you have any questions.

George J. Romanik
Intellectual Property Counsel
Hamilton Sundstrand Legal Department

Voice: 860.654.3144 (t/n 433.3144)
E-fax: 860.660.7588
Fax: 860.654.2614 (t/n 433.2614)
E-mail: george.romanik@hs.utc.com

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-----Original Message-----

From: Butchko, Karin H. [mailto:kbutchko@cgolaw.com]
Sent: Monday, January 26, 2004 4:29 PM
To: Song, Shihong G. UTRC; Morrison, Franklyn T.
Cc: ROMANIK, GEORGE J HS ; Cummings, Ronald G UTRC
Subject: RE: patent application for your reference EH-11083 entitled "High temperature aluminum gadolinium alloy"

Attached please find a revised draft of the patent application.

Karin H. Butchko
Carlson, Gaskey & Olds, P.C.
400 W. Maple Rd., Ste. 350
Birmingham, MI 48009
(248) 988-8688 Direct Dial
(248) 988-8360 Main
(248) 988-8363 Fax
Email: kbutchko@carlsongaskeyolds.com

-----Original Message-----

From: Song, Shihong G. UTRC [mailto:SongSG@utrc.utc.com]
Sent: Monday, January 26, 2004 2:59 PM
To: 'Morrison, Franklyn T.'
Cc: ROMANIK, GEORGE J HS ; Cummings, Ronald G UTRC; Butchko, Karin H.
Subject: RE: patent application for your reference EH-11083 entitled "High temperature aluminum gadolinium alloy"

Thanks Tyler. Some additional comments included.

Shihong Gary Song

United Technologies Research Center
411 Silver lane, MS129-22
East Hartford, 06108
(860) 610-7075 (t)
(860) 610-1697 (f)

-----Original Message-----

From: Morrison, Franklyn T. [mailto:franklyn.morrison@pw.utc.com]
Sent: Friday, January 23, 2004 11:50 AM
To: ROMANIK, GEORGE J HS ; CUMMINGS, RONALD G UTRC; SONG, SHIHONG G UTRC
Subject: FW: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

Redacted

-----Original Message-----

From: Butchko, Karin H. [mailto:kbutchko@cgolaw.com]
Sent: Thursday, January 22, 2004 2:43 PM
To: Romanik, George J. HS; Morrison, Franklyn T.; songsg@utrc.utc.com
Cc: CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

Redacted

Karin H. Butchko
Carlson, Gaskey & Olds, P.C.
400 W. Maple Rd., Ste. 350
Birmingham, MI 48009
(248) 988-8688 Direct Dial
(248) 988-8360 Main
(248) 988-8363 Fax
Email: kbutchko@carlsongaskeyolds.com

-----Original Message-----

From: Romanik, George J. HS [mailto:george.romanik@hs.utc.com]
Sent: Thursday, January 15, 2004 5:22 PM
To: Butchko, Karin H.; Morrison, Franklyn T.
Cc: CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

[REDACTED]
George J. Romanik
Intellectual Property Counsel
Hamilton Sundstrand Legal Department

Voice: 860.654.3144 (t/n 433.3144)
E-fax: 860.660.7588
Fax: 860.654.2614 (t/n 433.2614)
E-mail: george.romanik@hs.utc.com

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-----Original Message-----

From: Butchko, Karin H. [mailto:kbutchko@cgoilaw.com]
Sent: Thursday, January 15, 2004 5:12 PM
To: Romanik, George J. HS; Morrison, Franklyn T.
Cc: CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

Karin H. Butchko
Carlson, Gaskey & Olds, P.C.
400 W. Maple Rd., Ste. 350
Birmingham, MI 48009
(248) 988-8688 Direct Dial
(248) 988-8360 Main
(248) 988-8363 Fax
Email: kbutchko@carlsongaskeyolds.com

-----Original Message-----

From: Romanik, George J. HS [mailto:george.romanik@hs.utc.com]
Sent: Thursday, January 15, 2004 4:15 PM
To: 'Morrison, Franklyn T.'; Butchko, Karin H.
Cc: CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

George J. Romanik
Intellectual Property Counsel
Hamilton Sundstrand Legal Department

Voice: 860.654.3144 (t/n 433.3144)
E-fax: 860.660.7588
Fax: 860.654.2614 (t/n 433.2614)
E-mail: george.romanik@hs.utc.com

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-----Original Message-----

From: Morrison, Franklyn T. [mailto:franklyn.morrison@pw.utc.com]
Sent: Thursday, January 15, 2004 3:34 PM
To: 'Butchko, Karin H.'; ROMANIK, GEORGE J HS
Cc: CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

[REDACTED]

-----Original Message-----

From: Butchko, Karin H. [mailto:kbutchko@cgolaw.com]
Sent: Thursday, January 15, 2004 3:31 PM
To: Romanik, George J. HS; Morrison, Franklyn T.
Cc: CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

-----Original Message-----
From: Romanik, George J. HS [mailto:george.romanik@hs.utc.com]
Sent: Tuesday, December 16, 2003 1:16 PM
To: 'Morrison, Franklyn T.'; Butchko, Karin H.
Cc: CUMMINGS, RONALD G UTRC; Gaskey, David
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

Redacted

George J. Romanik
Intellectual Property Counsel
Hamilton Sundstrand Legal Department

Voice: 860.654.3144 (t/n 433.3144)
E-fax: 860.660.7588
Fax: 860.654.2614 (t/n 433.2614)
E-mail: george.romanik@hs.utc.com

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-----Original Message-----
From: Morrison, Franklyn T. [mailto:franklyn.morrison@pw.utc.com]
Sent: Tuesday, December 16, 2003 11:57 AM
To: 'Butchko, Karin H.'
Cc: ROMANIK, GEORGE J HS ; CUMMINGS, RONALD G UTRC
Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

Redacted

-----Original Message-----

From: Butchko, Karin H. [mailto:kbutchko@cgalaw.com]

Sent: Tuesday, December 16, 2003 11:19 AM

To: Morrison, Franklyn T.

Subject: RE: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

Redacted

Karin H. Butchko
Carlson, Gaskey & Olds, P.C.
400 W. Maple Rd., Ste. 350
Birmingham, MI 48009
(248) 988-8688 Direct Dial
(248) 988-8360 Main
(248) 988-8363 Fax
Email: kbutchko@carlsongaskeyolds.com

-----Original Message-----

From: Morrison, Franklyn T. [mailto:franklyn.morrison@pw.utc.com]

Sent: Monday, December 15, 2003 4:13 PM

To: Butchko, Karin H.

Subject: FW: patent application for your reference EH-11083 entitled
"High temperature aluminum gadolinium alloy"

>
>
>
>
>
>

Redacted

-----Original Message-----

From: Butchko, Karin H. [mailto:kbutchko@cgolaw.com]
Sent: Thursday, December 11, 2003 10:16 AM
To: morrisft@pweh.com
Subject: patent application for your reference EH-11083 entitled "High temperature aluminum gadolinium alloy"

Tyler,
Attached please find a draft of the above-referenced patent application.
I
am currently revising the application to include the disclosure of
another
aluminum-rare earth element alloy. I will forward a revised draft with
this
information shortly. Thank you.

<<022application.doc>> <<Informal Drawings.pdf>>

Karin H. Butchko
Carlson, Gaskey & Olds, P.C.
400 W. Maple Rd., Ste. 350
Birmingham, MI 48009
(248) 988-8688 Direct Dial
(248) 988-8360 Main
(248) 988-8363 Fax
Email: kbutchko@carlsongaskeyolds.com